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| 10/575,716 | 04/13/2006 | Shinichi Kaga | 2006-0543A | 3530 |

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| EXAMINER | |
|---|---|
| COX, ALEXIS K | |
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| 3744 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/575,716 | KAGA ET AL. | |
| | Examiner | Art Unit | |
| | ALEXIS K. COX | 3744 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *17-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *17-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claim 33 is objected to because of the following informalities: the term "set temperature" should be changed to "target temperature" or "target physical amount" to bring it into accordance with the rest of the claims. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 17-20, 22, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Longtin (US Patent No. 5,566,879).

Regarding claims 17 and 24, Kobayashi et al discloses a refrigerating storage cabinet (refrigerator, see column 1 line 8) comprising a refrigeration unit for refrigerating an inner atmosphere, the refrigerating unit including a compressor (see column 1 line 9) and an evaporator which is inherently present in order to cool the interior of the refrigerator of Kobayashi et al, the compressor including a plurality of performance levels (see column 1 lines 8-10), a storing unit (5, see column 2 lines 16-17) configured to store a cooling characteristic including a target physical amount as a function of operating time (2, Ts, see column 2 lines 23-25 and 57-58), a physical amount sensor which detects a current physical amount at predetermined intervals of operating time (1, Ta, see column 2 lines 23-25 and 57-58); an operation control unit (5, see column 2 lines 16-17 and 29-35) which controls the compressor by selecting one of the plurality of performance levels based upon a relationship between the current physical amount and the target physical amount for the current predetermined interval of operating time (see column 2 lines 31-35 and 58-68). It is noted that Kobayashi does not explicitly disclose the target physical amount to vary with operating time; specifically, it is noted that Kobayashi does not disclose the target physical amount to reduce with operating time.

Longtin discloses a quadratic function to be the ideal curve for temperature variation of a controlled area with respect to time (see column 8 lines 29-38) when modeling time-temperature curves. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to implement the quadratic function of Longtin in the system of Kobayashi et al as the cooling curve, in order to have a realistic time-temperature curve to attain. Further, it is noted that the curve of Longtin is specifically applied to heating, and therefore increases over time; the obvious application of this curve to a cooling system results in a decrease of the target physical amount over time.

Regarding claim 18, Kobayashi discloses the physical amount sensor to be configured to detect a current temperature of the inner atmosphere as the current physical amount (Ta, see column 2 lines 23-25), the cooling characteristic to include a target temperature as the target physical amount and to be a pull down characteristic for a temperature range from above a predetermined high temperature to near a set temperature (see column 2 lines 48-52); and the predetermined high temperature to be set to be higher than the set temperature by a value larger than a predetermined value.

Regarding claim 19, Kobayashi et al discloses the cooling characteristic to include an upper limit that is higher by the predetermined value than the set temperature (Dn, see column 2 line 48), a lower limit temperature that is lower by the predetermined value than the set temperature (Dm, see column 2 line 54), a control-cooling characteristic for a control-cooling zone between and including the upper limit temperature and the lower limit temperature, as without this characteristic cooling would not take place at all; the operation control unit to control the compressor according to

the control-cooling characteristic when the current physical amount is in the control-cooling zone, and the operation control unit turns off the compressor when the current physical amount reaches the lower limit temperature from a temperature higher than the lower limit compressor (see column 3 lines 18-20), and when the current physical amount reaches the upper limit temperature from a temperature lower than the upper limit temperature, the compressor is operationally controlled by the operation control unit (see column 2 lines 31-35).

Regarding claim 20, the refrigerating storage cabinet of Kobayashi et al comprises a speed-controllable inverter compressor (6, 7, see column 2 lines 19-21), with the operation control unit comprises a physical amount change computing section configured to compute a physical amount reduction degree at the predetermined intervals of operating time (1, see column 2 lines 23-25), a target physical amount reduction degree output section configured to provide a target physical amount reduction degree corresponding to the predetermined intervals of operating time (2, 4, see column 2 lines 25-29), a comparing section configured to compare the current physical amount reduction degree to the target physical amount reduction degree corresponding to the current operating time (5, see column 2 lines 29-33), and a speed control section configured to control the inverter compressor so that a rotational speed of the inverter compressor is increased when the comparing section indicates that the current physical amount reduction degree is smaller than the target physical amount reduction degree, and decreasing the rotational speed of the inverter compressor when

the comparing section indicates that the current physical amount reduction degree is larger than the target physical amount reduction degree (6, see column 2 lines 31-35).

Regarding claim 21, Kobayashi et al discloses the refrigerating storage unit to have a pull down characteristic that is a linear function, with the target physical amount reduction degree being a constant value (see column 2 lines 48-52).

Regarding claims 22 and 23, Kobayashi et al discloses the refrigerating storage cabinet to have a control-cooling characteristic that is a linear function (see column 2 lines 53-58), wherein the target physical amount reduction degree is a constant value.

Regarding claim 30, Kobayashi et al discloses the refrigerating storage cabinet to be configured to store a plurality of cooling characteristics (see column 2 lines 48-68), and the operational control unit to be configured to execute an appropriate one of the cooling characteristics based upon the physical amount.

6. Claims 29-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) and Longtin (US Patent No. 5,566,879) in view of Okamoto et al (US Patent No. 4,959,969).

Regarding claims 29 and 30, it is noted that Kobayashi et al and Longtin does not explicitly disclose the presence of multiple pull down zones. However, Okamoto et al does disclose the presence of multiple pull down zones (see table I; see also column 3 lines 32-39), with the appropriate one of the plurality of the pull down characteristics executed based on the physical amount. Further, it would have been obvious to one of ordinary skill in the art to implement the multiple zones of Okamoto in the system of Kobayashi et al and Longtin in order to improve efficiency of the system.

Regarding claims 31 and 32, it is noted that Kobayashi et al and Longtin do not disclose the presence of a plurality of pull down characteristics. Okamoto et al explicitly discloses the presence of multiple pull down characteristics which are selected based upon monitored physical amounts (see table 1; see also column 3 lines 32-39). It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to implement the multiple zones of Okamoto in the system of Kobayashi et al and Longtin in order to improve the efficiency and flexibility of the system.

Regarding claim 33, Kobayashi et al discloses the operation control unit to select a first cooling characteristic from when a difference between the current physical amount and the target temperature is less than a predetermined amount; and the operation control unit selects a second cooling characteristic when the difference between the current physical amount and the target temperature is greater than or equal to the predetermined amount; and each cooling characteristic requires a different temperature degree drop, with the first temperature degree drop being smaller than the second temperature degree drop (see column 2 lines 48-68), as the larger the difference between current temperature and target temperature the greater the required temperature degree.

Regarding claim 34, it is noted that Kobayashi et al and Longtin does not explicitly disclose the use of an auxiliary cooling characteristic comprising a temperature curve in which a convergence temperature remains at a temperature higher by an auxiliary predetermined value than the set internal temperature, with the auxiliary cooling characteristic selected as the appropriate one of the plurality of cooling

characteristics when a difference between the physical amount and an evaporation temperature of the evaporator is at or above a predetermined auxiliary temperature value or when the physical amount is higher than the target physical amount by a predetermined auxiliary temperature value. However, the programming of such a mode in the controller of Kobayashi et al falls within the realm of common knowledge as an obvious mechanical expedient, and it would have been obvious to one of ordinary skill in the art at the time of the invention to implement one of the plurality of modes of Okamoto in the system of Kobayashi et al and Longtin as such an auxiliary mode to promote energy savings in the overall system.

7. Claims 17-23, 25-26, 28, 30, and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US Patent No. 4,662,185) in view of Stamp (US Patent No. 4,328,680).

Regarding claims 17 and 35, Kobayashi et al discloses a refrigerating storage cabinet (refrigerator, see column 1 line 8) comprising a refrigeration unit for refrigerating an inner atmosphere, the refrigerating unit including a compressor (see column 1 line 9) and an evaporator which is inherently present in order to cool the interior of the refrigerator of Kobayashi et al, the compressor including a plurality of performance levels (see column 1 lines 8-10), a storing unit (5, see column 2 lines 16-17) configured to store a cooling characteristic including a target physical amount as a function of operating time (2, Ts, see column 2 lines 23-25 and 57-58), a physical amount sensor which detects a current physical amount at predetermined intervals of operating time (1, Ta, see column 2 lines 23-25 and 57-58); an operation control unit (5, see column 2

lines 16-17 and 29-35) which controls the compressor by selecting one of the plurality of performance levels based upon a relationship between the current physical amount and the target physical amount for the current predetermined interval of operating time (see column 2 lines 31-35 and 58-68). It is noted that Kobayashi et al does not explicitly disclose the target physical amount to decrease gradually with lapse of operating time according to the cooling characteristic. Stamp explicitly discloses the use of a target time-temperature function which is exponential (see column 11 lines 8-16), or one which is constituted by a table of values. As the systems of Stamp and Kobayashi et al are similar in structure and function, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the exponential function target of Stamp in the system of Kobayashi et al in order to provide control of the compressor which is smoother and therefore less wearing.

Regarding claim 18, Kobayashi discloses the physical amount sensor to be configured to detect a current temperature of the inner atmosphere as the current physical amount (Ta, see column 2 lines 23-25), the cooling characteristic to include a target temperature as the target physical amount and to be a pull down characteristic for a temperature range from above a predetermined high temperature to near a set temperature (see column 2 lines 48-52); and the predetermined high temperature to be set to be higher than the set temperature by a value larger than a predetermined value.

Regarding claims 19 and 36, Kobayashi et al discloses the cooling characteristic to include an upper limit that is higher by the predetermined value than the set temperature (Dn, see column 2 line 48), a lower limit temperature that is lower by the

predetermined value than the set temperature (Dm, see column 2 line 54), a control-cooling characteristic for a control-cooling zone between and including the upper limit temperature and the lower limit temperature, as without this characteristic cooling would not take place at all; the operation control unit to control the compressor according to the control-cooling characteristic when the current physical amount is in the control-cooling zone, and the operation control unit turns off the compressor when the current physical amount reaches the lower limit temperature from a temperature higher than the lower limit compressor (see column 3 lines 18-20), and when the current physical amount reaches the upper limit temperature from a temperature lower than the upper limit temperature, the compressor is operationally controlled by the operation control unit (see column 2 lines 31-35).

Regarding claim 20, the refrigerating storage cabinet of Kobayashi et al comprises a speed-controllable inverter compressor (6, 7, see column 2 lines 19-21), with the operation control unit comprises a physical amount change computing section configured to compute a physical amount reduction degree at the predetermined intervals of operating time (1, see column 2 lines 23-25), a target physical amount reduction degree output section configured to provide a target physical amount reduction degree corresponding to the predetermined intervals of operating time (2, 4, see column 2 lines 25-29), a comparing section configured to compare the current physical amount reduction degree to the target physical amount reduction degree corresponding to the current operating time (5, see column 2 lines 29-33), and a speed control section configured to control the inverter compressor so that a rotational speed

of the inverter compressor is increased when the comparing section indicates that the current physical amount reduction degree is smaller than the target physical amount reduction degree, and decreasing the rotational speed of the inverter compressor when the comparing section indicates that the current physical amount reduction degree is larger than the target physical amount reduction degree (6, see column 2 lines 31-35).

Regarding claim 21, Kobayashi et al discloses the refrigerating storage unit to have a pull down characteristic that is a linear function, with the target physical amount reduction degree being a constant value (see column 2 lines 48-52).

Regarding claims 22 and 23, Kobayashi et al discloses the refrigerating storage cabinet to have a control-cooling characteristic that is a linear function (see column 2 lines 53-58), wherein the target physical amount reduction degree is a constant value.

Regarding claims 25, 26, and 28, it is noted that Kobayashi et al does not disclose the use of an exponential function or a reference table for the pull down characteristic. Stamp explicitly discloses the use of a target time-temperature function which is exponential (see column 11 lines 8-16), or one which is constituted by a table of values. It would therefore have been obvious to one of ordinary skill in the art to use an exponential function or table of values, as in Stamp, in the system of Kobayashi et al in order to provide control of the compressor which is smoother and therefore less wearing.

Regarding claim 30, Kobayashi et al discloses the refrigerating storage cabinet to be configured to store a plurality of cooling characteristics (see column 2 lines 48-68),

and the operational control unit to be configured to execute an appropriate one of the cooling characteristics based upon the physical amount.

***Response to Arguments***

8. Applicant's arguments filed 8/12/2009 have been fully considered but they are not persuasive.

Regarding claim 17, the applicant argues on page 11 that Kobayashi fails to disclose a decrease in the target physical amount over time. The applicant further argues on page 11 that Stamp fails to disclose the target physical amount decreasing with lapse of operating time.

It is true that temperature is not the physical amount used by Stamp. Rather, Stamp uses a timer to change compressor speeds according to suction pressure. As claim 17 does not claim the target physical amount to be the target temperature, this argument is not persuasive. Indeed, the target physical amount may, in a reasonable and broad interpretation, be the temperature difference between the current temperature and the set temperature, or the pressure difference between current pressure and set pressure. It could even be the change in measured temperature per unit time. In the interpretation in which the target amount is the change per unit time, it is inherently present in the systems of Stamp and Kobayashi both.

Further, Longtin explicitly disclose a change in target temperature over time. As the system of Longtin is a heating system, it is a reasonably obvious alteration that when implementing this change in the cooling system of Kobayashi et al, the target temperature would fall rather than rise, as the two systems have opposite desired

effects achieved through similar means. Okamoto also discloses change in target temperature over time, and as such similarly overcomes the argues absence of the limitation. It should be readily apparent from the rejection above that the limitation of a reduction of a target physical amount over time has been met repeatedly by the art cited.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXIS K. COX whose telephone number is (571)270-5530. The examiner can normally be reached on Monday through Thursday 8:00a.m. to 5:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AKC/

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744